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EXAMINER	
LIU, LI	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/789,998	TERAHARA, TAKAFUMI	
	Examiner	**Art Unit**	
	LI LIU	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 December 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-5 and 8-16 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5 and 8-16 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 14 March 2007 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim1-5 and 8-15 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's argument – "Design choice is a choice between two alternatives that will make no difference to the functioning of the invention. That is, one choice over another provides no advantages. It is submitted that the feature of the coupler or interleaver and recited in claims 4 and 5 provides the advantage of separating and combining wavelengths over other choices. That is, the coupler or interleaver is a significant limitation that provides beneficial advantages over the prior art and is a feature not taught or suggested by the prior art".

Examiner's response – In the disclosure, the applicant states "[i]n the case where the WDM couplers are used as the optical multiplexing/demultiplexing devices 11_{1A}, 11_{1B} to 11_{3A}, 11_{3B}, a transition region of required width occurs between the short wavelength side region and the long wavelength side region, and optical signals can not be arranged within this transition region. Therefore, there is a disadvantage in that the usable wavelength band is limited. On the other hand, in the case where the optical interleavers are used, the light passing characteristics between respective ports are varied sharply. Therefore, the above disadvantage in that the wavelength band is limited is resolved" (page 8, last paragraph). That is, the applicant compares the couplers with the interleavers. The applicant does not disclose how the "coupler" or "interleaver"

provides “beneficial advantages over the prior art” and why it is “a feature not taught or suggested by the prior art”.

Ahmadvand et al actually teaches cascading interleavers. Therefore, the multiplexer/demultiplexer of Ahmadvand et al is better than the structure formed by the couplers. That is, the coupler/interleaver of the applicant “provides no advantages” over the Ahmadvand et al; at most they are equivalent.

Also, one of the widely used wavelength division multiplexing WDM devices is the arrayed waveguide grating (AWG). The AWG is capable of precisely demultiplexing a high number of optical signals with relatively low loss. The inherent advantages of the AWG also include precisely-controlled channel spacing (easily matched to the ITU grid), simple and accurate wavelength stabilization, low and uniform insertion loss, narrow and accurate channel spacing, large channel numbers, polarization insensitivity and high stability. McMahon does not expressly disclose what type of the WDM device used, an AWG device can be used since the AWG has been widely used in the art.

The applicant does not disclose why “the feature of the coupler or interleaver and recited in claims 4 and 5 provides the advantage of separating and combining wavelengths over other choices” such as AWG etc.

Therefore, the rejection based on the design choice is proper.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McMahon (US 5,208,692) in view of Ahmadvand et al (US 6,754,411) and Pan et al (US 5,889,904).

1). With regard to claim 1, McMahon discloses a multi-directional optical branching apparatus (the "transmultiplexer" 14 in Figure 2, column 4 line 26-44, and Figure 4), connected to N ($N \geq 3$) optical transmission paths (6 in Figure 4; four input/output ports are presented in Figure 4, N=4) each having a pair of optical paths corresponding to an up-link (12a in Figure 4) and a down-link (12 in Figure 4) which transmit wavelength division multiplexed signal lights in mutually different directions, for demultiplexing (22a in Figure 4) a wavelength division multiplexed signal light input from an input side optical path of each of optical transmission paths into N-1 wavelength groups (the three output groups: "1", "2" and "3"), and then multiplexing (22b in Figure 4) each demultiplexed group with optical signals of different wavelength groups from other directions to output the multiplexed signal light to each output side optical path of a predetermined optical transmission path, comprising:

2xN optical multiplexing/demultiplexing devices (22 in Figure 4; 4 input/output ports, 8 multiplexer/demultiplexer) each including one common port (the input port of multiplexer 22a, and the output port of demultiplexer 22b) which is connected in one to one with any one of the input side optical paths (the input port of multiplexer 22a is connected to the downlink 12, one to one) or the output side optical paths paths (the

output port of demultiplexer 22b is connected to the uplink 12a, one to one) of said N optical transmission paths, and N-1 branch ports (e.g, 3 output from the demultiplexer 22a), and being capable of demultiplexing a wavelength division multiplexed signal light input to the common port into the respective wavelength groups (column 8 line 28-64), to output from the corresponding branch ports (the ports 1,2 and 3 of demultiplexer 22a in Figure 4), and also multiplexing the optical signals (the multiplexer 22b multiplexes the signals), which belong to the respective wavelength groups (column 8 line 28-64), input to the branch ports (the branch ports 1,2 and 3 of demultiplexer receive the signal from other ports), to output from the common port (the output port of multiplexer 22b, which connected to the fiber 12a); and

a branch port connecting section (the fiber connections in Figure 4, or inside of the circle in Figure 3) that connects in one to one between the respective branch ports (the branch ports 1, 2 and 3 in Figure 4) of said 2xN optical multiplexing/demultiplexing devices, in accordance with previously set connection rules (column 4 line 26-57 and column 8 line 28-64).

But, McMahon does not expressly discloses wherein when $N \geq 4$, for said optical multiplexing/demultiplexing devices, one common port and N-1 branch ports are formed by cascade connecting a plurality of devices each having one common port and two branch ports; and when the physical branch ports formed by cascade connecting the optical multiplexing/demultiplexing is M (M>N-1), said branch port connecting section groups two or more branch ports of said M branch ports, and virtually considers these

as N-1 branch ports outputting one even-numbered and two odd-numbered wavelength groups, and connects between each of the branch ports.

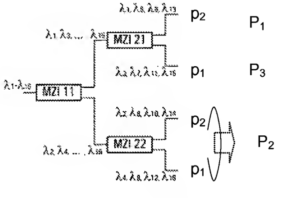

Figure O1

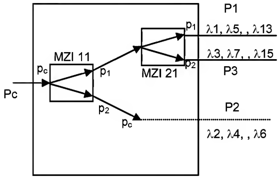

Figure O2

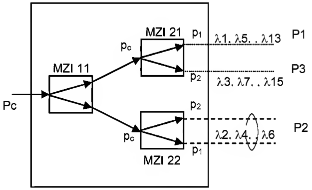

Figure O3

However, the cascading of two or more multiplexers/demultiplexers is a common practice in the art, as disclosed by Ahmadvand et al (Figure 3, or Figure O1 above) and Pan et al (Figure 25). Ahmadvand teaches a multiplexing/demultiplexing device that is formed by cascading interleavers (the even number and odd number of wavelengths are separated by the MZI). And another prior art, Pan et al, also teaches a

multiplexing/demultiplexing device formed by cascading wavelength couplers (Figure 25).

Figures O2 and O3 show the basic structures as taught by Ahmadvand et al; and wherein when $N \geq 4$, for the optical multiplexing/demultiplexing devices, one common port (Pc in Figures O2 and O3 above) and N-1 branch ports (three branch ports P1, P2 and P3) are formed by cascade connecting a plurality of devices (MZI interleavers) each having one common port (p_c in Figure O2) and two branch ports (p_1 and p_2 in Figure O2).

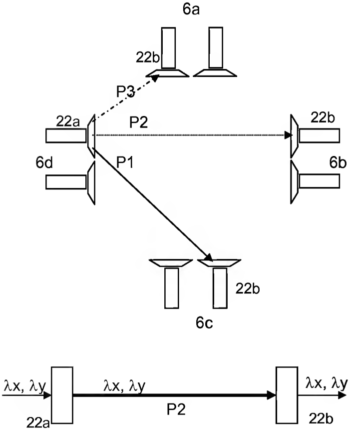

Figure O4

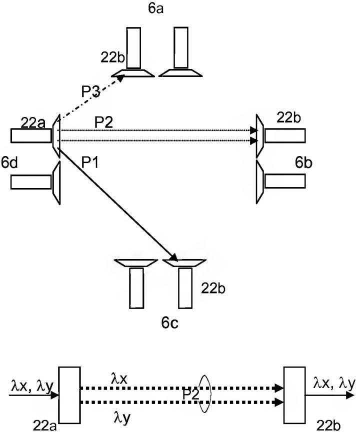

Figure O5

For M=4 (M>N-1), as disclosed by Ahmadvand, the multiplexing/demultiplexing devices are formed by cascade connecting a plurality of devices each having one common port and two branch ports (see Figure O3 above; and in Figure 3 of Ahmadvand et al, MZI 21 has two outputs and MZI 22 has two outputs, so total 4 (M = 4) physical branch ports are formed by MZI 21 and MZI 22.). Then, the output ports p1 and p2 from the MZI 22 can be grouped together and viewed as "one branch port" P2, and connected to other ports, so to form a "virtually" N-1 branch ports outputting one even-numbered (the port P2 outputs the even-numbered wavelength group, Figures O1 and O3) and two odd-numbered wavelength groups (the port P1 outputs the odd-numbered wavelength group λ1, λ3 … λ13, the port P3 outputs the odd-numbered wavelength group λ3, λ5 … λ15, Figures O1 and O3).

In McMahon's system, four multiplexing/demultiplexing devices N = 4 (6a – 6d in Figures 3 and 4), so the M > N-1. Therefore, when a similar cascading device as taught by Ahmadvand is used in the system of McMahon, the two outputs from MZI 22 can be grouped together and connected to another two ports of other ports of other multiplexing/demultiplexing device (e.g., the 22b in 6b in Figure O5 above).

As shown in Figure O5, when physical branch ports is four, and there are only three multi/demultiplexing devices 22b to receive the signals from 22a, the fourth port can be connected to any one of the multi/demultiplexing devices 22b since each of the devices 22b also has four branch ports.

The applicant states that the port p_1 and p_2 of 21c in Figure 12 is virtually considered as one port. However, these ports p_1 and p_2 are physically connected to two

ports of another branch section, e.g., two ports of 21_{1A} are connected to two ports of 21_{3B} in Figure 11; that is, they are physically connected, not virtually connected.

In telecommunication, the “virtual” is something that pretends to be something it isn’t, but can be made to appear to be that thing. In Figure O4, the P2 can be also considered to virtually have two links because two wavelength channels are presented in the one fiber link.

And more, as shown in Figures O5, to use two fiber links to transmit two wavelengths channels individually do not define a patentably distinct over that in Figure O4 which uses one fiber to transmit two wavelength channels since both configuration are directed to transmit two wavelength channels from 22a to 22b; the function and result of the two structures are exactly the same.

When more mux/demuxers are cascading to form a multiplexing/demultiplexing device having 5 or more branch ports, three or more fiber links can be connected from one multiplexing/demultiplexing device to another multiplexing/demultiplexing device. The suggestion/motivation for doing so would have been to further transmit more signal band or wavelength.

When using cascading couplers/interleavers to form a multiplexing/demultiplexing device, it is easier to arrange the outputs for different ports, or has more freedom to allocate the channels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the cascading of multiplexing/demultiplexing devices as taught by Ahmadvand et al and Pan et al to the system of McMahon so that more freedom of allocating the channels can be

obtained; and the desired signal band or wavelength can be conveniently transmitted to the desired target ports.

2). With regard to claim 2, McMahon and Ahmadvand et al and Pan et al discloses all of the subject matter as applied to claim 1 above, and McMahon further discloses wherein said branch port connecting section connects in one to one between the respective branch ports of said 2xN optical multiplexing/demultiplexing devices, to satisfy simultaneously;

a first connection rule in that branch ports (the port 1, 2 and 3 in Figure 4) of an optical multiplexing/demultiplexing device where a common port (the port connected to 12 in Figure 4) thereof is connected with an input side optical path of one optical transmission path among said N optical transmission paths, are connected in one to one with branch ports of an optical multiplexing/demultiplexing device (e.g., the branch ports 1, 2 and 3 in group 6 are respectively connected to group 6b, 6c and 6c) where a common port thereof is connected with an output side optical path of another optical transmission path (the input port of multiplexer 22a or the output port of 22b is connected to the downlink 12 or uplink 12a, one to one);

a second connection rule in that branch ports corresponding to the same wavelength group are connected with each other (Figure 4, same wavelength group are used to connect the branch ports, “1” to “1” , “2” to “2” and “3” to “3”, column 8 line 28-64); and

a third connection rule in that, for all of combinations where any two are selected from among said N optical transmission paths, between respective branch ports are

connected so that the up-link path and the down-link path are respectively linked (Figure 4, the branch ports of **multiplexer 22a**, which in turn is connected to uplink 12a, are connected to the branch ports of the **delmutiplexer 22b** which is in turn connected to downlink 12, so the the up-link path and the down-link path are respectively linked).

3). With regard to claim 3, McMahon and Ahmadvand et al and Pan et al discloses all of the subject matter as applied to claim 1 above, and McMahon further discloses wherein said N-1 wavelength groups are set so that the number of wavelengths of the optical signals in the wavelength group allocated to the up-link, and the number of wavelengths of the optical signals in the wavelength group allocated to the down-link, become the same (four input/output ports are presented in Figure 4; 3 wavelengths are used for the connection, same number of wavelengths are used for uplink and downlink, column 8 line 28-64).

4). With regard to claims 4 and 5, McMahon and Ahmadvand et al and Pan et al discloses all of the subject matter as applied to claim 1 above.

McMahon and Ahmadvand et al and Pan et al further discloses that the optical multiplexing/demultiplexing devices use WDM couplers which perform multiplexing/demultiplexing of optical signals (Figure 25 of Pan), with an adjacent plurality of optical signals of wavelengths, contained in each transmission region, of light passing characteristics corresponding to respective branch ports, as a single wavelength group (e.g., the coupler 271 separates the input wavelengths into group one λ1,2,3,4, and group two λ5,6,7,8; and then the couplers 272 and 273 further separate the wavelengths into λ1,2, λ3,4, λ5,6 and λ7,8);

And McMahon and Ahmadvand et al and Pan et al further discloses wherein said optical multiplexing/demultiplexing devices use optical interleavers (the MZIs are optical interleavers, Figure 3 of Ahmadvand) each having light passing characteristics which are periodically varied in a comb teeth shape corresponding to the respective branch ports (Figure 4), which alternately multiplex/demultiplex optical signals arranged at equal wavelength intervals.

By using the coupler, the demultiplexed channels can be grouped in "λ_1, λ_2, λ_3" and "λ_4, λ_5, λ_6"; and if using a interleaver, the demultiplexed channels can be grouped in "λ_1, λ_3, λ_5" and "λ_2, λ_4, λ_6".

Also, although McMahon does not specifically disclose the coupler or interleaver, such limitations are merely a matter of design choice and would have been obvious in the system of McMahon. McMahon teaches that the multiplexing/demultiplexing devices separate or combine the wavelength groups. The limitations in claims 4 and 5 do not define a patentably distinct invention over that in McMahon since both the invention as a whole and McMahon are directed to multiplexing or demultiplexing signals. The coupler and interleaver have been widely used in the art for separating and combining wavelengths. Therefore, to use coupler or interleaver or other kind of multiplexer/demultiplexer would have been a matter of obvious design choice to one of ordinary skill in the art.

5). With regard to claim 16, McMahon discloses a multi-directional optical branching apparatus (the "transmultiplexer" 14 in Figure 2, column 4 line 26-44, and

Figure 4) connected to optical transmission paths (6 in Figure 4; four input/output ports are presented in Figure 4, N=4), comprising:

physical branch ports (e.g, ports shown as 1, 2 and 3 in Figure 3) are formed by optical multiplexing/demultiplexing device (the multiplexer and demultiplexer 22 in Figure 3), and the branch ports outputting at least three wavelength groups (column 8, line 50-64), and connects between each of the branch ports (Figure 4).

But, McMahon does not expressly disclose that physical branch ports are formed by cascade connecting an opticalmultiplexing/demultiplexing devices.

However, the cascading of two or more multiplexers/demultiplexers is a common practice in the art, as disclosed by Ahmadvand et al (Figure 3, or Figure O1 above) and Pan et al (Figure 25). Ahmadvand teaches a multiplexing/demultiplexing device that is formed by cascading interleavers (the even number and odd number of wavelengths are separated by the MZI). And another prior art, Pan et al, also teaches that a multiplexing/demultiplexing device formed by cascading wavelength couplers.

When using cascading couplers/interleavers to form a multiplexing/demultiplexing device, it is easier to arrange the outputs for different ports, or has more freedom to allocate the channels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the cascading of multiplexing/demultiplexing devices as taught by Ahmadvand et al and Pan et al to the system of McMahon so that more freedom of allocating the channels can be obtained; and the desired signal band or wavelength can be conveniently transmitted to the desired target ports.

4. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over McMahon and Ahmadvand et al and Pan et al as applied to claim 1 above, and in further view of Park et al (US 2003/0058497).

1). With regard to claims 8 and 9, McMahon and Ahmadvand et al and Pan et al disclose all of the subject matter as applied to claim 1 above. But McMahon does not disclose the multi-directional optical branching apparatus, further comprising: (A) 2xN power adjusting devices provided on the respective optical paths connecting between the respective branch ports of said optical multiplexing/demultiplexing devices, which adjust the power of optical signals being propagated within said optical path; (B) optical spectrum monitor sections that respectively monitor the optical spectrums of the wavelength division multiplexed signal lights output from common ports of said optical multiplexing/demultiplexing devices to the output side optical paths of said optical transmission paths; and (C) control sections that respectively control said power adjustment devices in accordance with the monitor result of said optical spectrum monitor sections, so that the average power of the optical signals belonging to said respective wavelength groups are approximately the same; and (D) wherein said power adjusting devices are variable optical attenuators (claim 9).

However, Park et al, in the same field of endeavor, discloses an all-optical cross-connection (PXC). Park et al discloses: (A) and (D) power adjusting devices (the variable optical attenuator VOA 34 in Figures 2-5) provided on the respective optical paths connecting between the respective branch ports of the optical

multiplexing/demultiplexing devices, which adjust the power of optical signals being propagated within said optical path ([0020] and [0040]); (B) optical spectrum monitor sections (the optical spectrum analyzer OSA 30 in Figures 2-5) that respectively monitor the optical spectrums of the wavelength division multiplexed signal lights output from common ports of said optical multiplexing/demultiplexing devices to the output side optical paths of said optical transmission paths ([0036], [0037] and [0040]); and (C) control sections (Controller 35 in Figures 2-5) that respectively control said power adjustment devices in accordance with the monitor result of said optical spectrum monitor sections, so that the average power of the optical signals belonging to said respective wavelength groups are approximately the same ([0020], [0037] and [0040]).

Park et al's controlling system provide optimum signal powers, signal to noise ratios, signal quality (Q), and reduces network operational cost, improves network reach and significantly enhances network agility (ABSTRACT and [0016]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the power controlling system as taught by Park et al to the system of McMahon and Ahmadvand et al and Pan et al so that a high signal quality, low cost connection system can be obtained.

2). With regard to claims 10, McMahon and Ahmadvand and Pan et al and Park et al disclose all of the subject matter as applied to claims 1 and 8 above. But McMahon does not disclose wherein said power adjusting devices are optical amplifiers.

It is well known in the art that the amplifier can be used to adjust the power of the signal, similar to the pre-amplifier 12 or amplifier 16 in Figures 2-4 of Park et al's

system, the gain settings of these amplifiers are adjusted by the OSA. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplifier as taught by Park et al to the system of McMahon and Ahmadvand et al and Pan et al so that a high signal quality, low cost connection system can be obtained.

3). With regard to claims 11 and 12, McMahon and Ahmadvand et al and Pan et al and Park et al disclose all of the subject matter as applied to claims 1 and 8 above. But McMahon does not disclose (A) wherein said optical amplifiers are provided between the input side optical paths of said optical transmission paths, and the common ports of said optical multiplexing/demultiplexing devices connected with said input side optical paths; and (B) wherein said optical amplifiers are provided between the output side optical paths of said optical transmission paths, and the common ports of said optical multiplexing/demultiplexing devices connected with said output side optical paths (claim 12).

However, Park et al, in the same field of endeavor, discloses that (A) optical amplifiers (16 in Figures 2-5) are provided between the input side optical paths (the fiber 11a in Figure 2-5) of said optical transmission paths, and the common ports (the input port of demultiplexer 18) of said optical multiplexing/demultiplexing devices connected with said input side optical paths (amplifier 16 is between the input fiber 11a and demultiplexer 18); and (B) optical amplifiers (28 in Figures 2-5) are provided between the output side optical paths (the fiber 11a’ in Figure 2-5) of said optical transmission paths, and the common ports (the output port of multiplexer 26 in Figures 2-5) of said

optical multiplexing/demultiplexing devices connected with said input side optical paths (amplifier 28 is between the multiplexer 26 and output fiber 11a').

Park et al's controlling system provide optimum signal powers, signal to noise ratios, signal quality (Q), and reduces network operational cost, improves network reach and significantly enhances network agility (ABSTRACT and [0016]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the amplifiers and the power controlling system as taught by Park et al to the system of McMahon and Ahmadvand et al and Pan et al so that a high signal quality, low cost connection system can be obtained.

4). With regard to claim 13, McMahon and Ahmadvand et al and Pan et al and Park et al discloses all of the subject matter as applied to claim 1 above. But McMahon does not disclose: (A) N optical amplifiers provided between the input side optical paths of said optical transmission paths, and the common ports of said optical multiplexing/demultiplexing devices connected with said input side optical paths; (B) optical power monitor sections that respectively monitor the total power of the wavelength division multiplexed signal lights output from said optical amplifiers; and (C) control sections that respectively control driving states of said optical amplifiers so that the total power of the wavelength division multiplexed signal lights monitored by said optical power monitor sections becomes constant at a predetermined level common to respective directions.

However, Park et al, in the same field of endeavor, discloses that (A) optical amplifiers provided between the input side optical paths of said optical transmission

paths (16 in Figures 2-5), and the common ports of said optical multiplexing/demultiplexing devices connected with said input side optical paths (amplifier 16 is between the input fiber 11a and demultiplexer 18); (B) optical power monitor sections (the optical spectrum analyzer OSA 30 in Figures 2-5, [0036] and [0041]) that respectively monitor the total power of the wavelength division multiplexed signal lights output from said optical amplifiers; and (C) control sections (the OSA also controls the power of the amplifiers, [0036 and [0041]) that respectively control driving states of said optical amplifiers so that the total power of the wavelength division multiplexed signal lights monitored by said optical power monitor sections becomes constant at a predetermined level common to respective directions ([0036 and [0041]).

Park et al's controlling system provides optimum signal powers, signal to noise ratios, signal quality (Q), and reduces network operational cost, improves network reach and significantly enhances network agility (ABSTRACT and [0016]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the amplifier and power controlling system as taught by Park et al to the system of McMahon and Ahmadvand et al and Pan et al so that a high signal quality, low cost connection system can be obtained.

5). With regard to claim 14, McMahon and Ahmadvand et al and Pan et al and Park et al discloses all of the subject matter as applied to claims 1 and 13 above. But McMahon does not disclose wherein optical amplifiers are provided between the output side optical paths of said optical transmission paths, and the common ports of said

optical multiplexing/demultiplexing devices connected with said output side optical paths.

However, Park et al, in the same field of endeavor, discloses that wherein optical amplifiers (28 in Figures 2-5) are provided between the output side optical paths (the fiber 11a' in Figure 2-5) of said optical transmission paths, and the common ports (the output port of multiplexer 26 in Figures 2-5) of said optical multiplexing/demultiplexing devices connected with said output side optical paths (amplifier 28 is between the multiplexer 26 and output fiber 11a').

Park et al's controlling system provides optimum signal powers, signal to noise ratios, signal quality (Q), and reduces network operational cost, improves network reach and significantly enhances network agility (ABSTRACT and [0016]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the amplifiers and the power controlling system as taught by Park et al to the system of McMahon and Ahmadvand et al and Pan et al so that a high signal quality, low cost connection system can be obtained.

6). With regard to claim 15, McMahon and Ahmadvand et al and Pan et al and Park et al discloses all of the subject matter as applied to claims 1 and 13 above. And McMahon further discloses wherein the multidirectional optical branching apparatus is used for an optical branching node (the transmultiplexer 12 is used as the optical branching node, Figures 2 and 9).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Huang et al (US 6,560,380);

Wang et al (US 6,545,782);

Cearns et la (US 5,943,149).

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Li Liu
March 25, 2008

/Kenneth N Vanderpuye/
Supervisory Patent
Examiner, Art Unit 2613